

Exhibit 1

(part 1)

BEFORE
THE PUBLIC SERVICE COMMISSION OF
SOUTH CAROLINA
DOCKET NO. 2008-196-E – ORDER NO. 2009- 104(A)
March 2, 2009

IN RE:)
)
Combined Application of South Carolina)
Electric & Gas Company for a Certificate)
of Environmental Compatibility and Public)
Convenience and Necessity and for a)
Base Load Review Order for the)
Construction and Operation of a Nuclear)
Facility in Jenkinsville, South Carolina.)
_____)

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SOUTH CAROLINA

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IN RE:	Combined Application of South Carolina)	ORDER APPROVING
	Electric & Gas Company for a Certificate of)	COMBINED
	Environmental Compatibility and Public)	APPLICATION
	Convenience and Necessity and for a Base)	(FINAL VERSION) ¹
	Load Review Order for the Construction and)	
	Operation of a Nuclear Facility in)	
	Jenkinsville, South Carolina)	

I. INTRODUCTION

This matter comes before the Public Service Commission of South Carolina (the “Commission”) on the Combined Application (the “Combined Application”) of South Carolina Electric & Gas Company (“SCE&G” or “the Company”) which was filed with the Commission on May 30, 2008. That Combined Application seeks a Certificate of Environmental Compatibility and Public Convenience and Necessity and for a Base Load Review Order to construct and operate a two-unit, 2,234 net megawatt (“MW”) nuclear facility to be located at the V.C. Summer Nuclear Station (“VCSNS”) site near Jenkinsville, South Carolina (the “plant” or the “Units”). The Combined Application was filed pursuant to the provisions of the Utility Facility Siting and Environmental

¹ On Friday, February 27, 2009, this Commission issued its Order Approving Combined Application in the above docket. The version of the Order issued on that date accurately contained the findings of the Commission. However, some final edits were not captured due to a server malfunction. This present version contains final edits which were intended to be but not captured in the February 27 version of the Order.

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Protection Act, S.C. Code Ann. §§ 58-33-10 *et seq.* (the “Siting Act”) and the Base Load Review Act, S.C. Code Ann. §§ 58-33-210 *et seq.* (the “Base Load Review Act”).

The Combined Application states that in order to meet the growing needs of its customers for electric power and to support the continued economic development of the state of South Carolina, SCE&G plans to construct two AP1000 Advanced Passive Safety Power Plants (“AP1000”) and associated facilities (“Units 2 and 3”) approximately one (1) mile from VCSNS Unit 1 (“Unit 1”). Units 2 and 3 will be constructed by a consortium consisting of Westinghouse Electric Company, LLC (“Westinghouse”) and Stone & Webster, Inc. (“Stone & Webster”). The anticipated commercial service date for Unit 2 is April 1, 2016, and the anticipated commercial service date for Unit 3 is January 1, 2019. Units 2 and 3 will be owned by SCE&G and the South Carolina Public Service Authority (“Santee Cooper”) jointly. SCE&G will own a 55% undivided share in both Units and their output and Santee Cooper will own the remainder. SCE&G will be the operator of the Units.

In its Combined Application, SCE&G also requested that the Commission approve revised rates to reflect its cost of capital applied to its projected investment in Units 2 and 3 as of June 30, 2008. The Company requested that the proposed revised rates be effective on issuance of a base load review order. As requested in the Combined Application, the proposed average increase to the residential class was 0.52%; small general service class was 0.48%; medium general service class was 0.51% and large general service class was 0.44%. The amount and percentage of these rate increases

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would vary by rate schedules within these classes, and individual customer bill increases would also vary depending upon actual usage patterns and amount of consumption.

On June 18, 2008, the Commission's Docketing Department instructed the Company to publish by June 30, 2008, a Notice of Filing and Hearing in newspapers of general circulation in the areas affected by the Company's Application and to provide a copy of that notice to each affected customer by July 31, 2008. The Notice of Filing and Hearing indicated the nature of the Company's Combined Application and advised all interested parties wishing to participate in the docket of the manner and time for intervention or appearance as a public witness. On July 31, 2008, the Company filed affidavits with the Commission demonstrating that the notice was duly published in accordance with the Docketing Department's instructions and certified that a copy of the notice was provided to each electric customer in its monthly bill. As attested to in an affidavit from the Company's counsel, copies of the Combined Application were also served on the chief executive officer of each municipality, and the head of each state and local government agency charged with the duty of protecting the environment or of planning land use in the area in the county in which any portion of the proposed facility will be located.

Timely petitions to intervene in this docket were received from CMC Steel South Carolina ("CMC Steel"), Pamela Greenlaw ("Ms. Greenlaw"), Friends of the Earth ("FOE"), Mildred A. McKinley ("Ms. McKinley"), Lawrence P. Newton ("Mr. Newton"), the South Carolina Energy Users Committee ("SCEUC"), Ruth Thomas ("Ms. Thomas"), Maxine Warshauer ("Ms. Warshauer"), Samuel Baker ("Mr. Baker"), and

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Joseph Wojcicki (“Mr. Wojcicki”). The Office of Regulatory Staff (“ORS”) is a party to the proceedings in this docket pursuant to S.C. Code Ann. §§ 58-4-10(B) (Supp. 2008) and 58-33-140(1)(b) (Supp. 2008). The South Carolina Department of Health and Environmental Control (“DHEC”), South Carolina Department of Natural Resources (“DNR”), South Carolina Department of Parks, Recreation and Tourism (“DPRT”), and the Town of Jenkinsville were listed as parties based on the provisions of S.C. Code Ann. § 58-33-140 but did not appear or take part in the proceedings. See also § 58-33-240(B) (such entities are recognized as parties only “to the extent [that they] seek to appear to raise issues”).

The Commission convened a hearing on this matter on December 1, 2008, with the Honorable Elizabeth B. Fleming, Chairman, presiding. SCE&G was represented by K. Chad Burgess, Esq.; Mitchell M. Willoughby, Esq.; and Belton T. Zeigler, Esq. ORS was represented by Nanette S. Edwards, Esq.; Shannon B. Hudson, Esq.; and C. Dukes Scott, Esq. FOE was represented by Robert Guild, Esq. and SCEUC was represented by Scott Elliott, Esq. CMC Steel did not appear at the hearing. Ms. Greenlaw, Ms. Warshauer, and Mr. Wojcicki each appeared *pro se*. At the commencement of the hearing, Mr. Newton waived his right to participate as an intervenor and instead made a statement as a public witness. Ms. Thomas did not appear at the hearing due to health issues but, without objection, Ms. Greenlaw was permitted to sponsor the testimony of one witness whose testimony Ms. Thomas had caused to be prefiled in the docket. See Commission Order No. 2008-797. Ms. McKinley appeared on the first and third day of the hearing but not thereafter. The remaining parties did not appear at the hearing.

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In support of the Combined Application, the Company presented the direct testimony of Kevin B. Marsh, President and Chief Operating Officer of SCE&G; Stephen A. Byrne, Senior Vice President and Chief Nuclear Officer of SCE&G; Jimmy E. Addison, Senior Vice President and Chief Financial Officer of SCE&G; E. Elizabeth Best, Director of Financial Planning and Investor Relations for SCANA Services, Inc.; Steven J. Connor, Project Manager for Tetra Tech NUS, Inc.; Stephen E. Summer, Senior Environmental Specialist for SCANA Services, Inc.; Robert B. Whorton, Senior Engineer for SCE&G; Dr. Joseph M. Lynch, Manager of Resource Planning for SCE&G; David K. Pickles, Southern Region Vice President for the Energy Efficiency Practice for ICF International; Hubert C. Young, III, Manager of Transmission Planning for SCE&G; and Kenneth R. Jackson, Vice President, Regulatory Matters for SCANA Services, Inc. SCE&G Witnesses Byrne, Addison, Lynch and Jackson provided rebuttal testimony in addition to their direct testimony.

The ORS presented the direct testimony of A. Randy Watts, Program Manager of the Electric Department; Malini R. Gandhi, Deputy Director of Auditing; Douglas H. Carlisle, Jr., Economist; Dr. Zhen Zhu, Senior Consulting Economist with C. H. Guernsey and Company; George W. Evans, Vice President of Slater Consulting; William R. Jacobs, Vice President of GDS Associates, Inc.; Jerry W. Smith, Senior Consultant at C. H. Guernsey and Company; and Mark W. Crisp, Managing Consultant of C. H. Guernsey and Company.

SCEUC offered the direct testimony of Kevin W. O'Donnell, CFA, President of Nova Energy Consultants, Inc. FOE presented the direct and surrebuttal testimony of

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Nancy Brockway of Brockway & Associates. Ms. Thomas presented the direct and surrebuttal testimony of Dr. Ronald P. Wilder of the Moore School of Business, University of South Carolina.

The Commission also heard from 26 public witnesses during sessions held on December 1, 2008, and December 3, 2008.

II. STATUTORY STANDARDS AND REQUIRED FINDINGS

At the outset, we find that SCE&G is a privately owned electric utility which has its principal offices in Columbia, South Carolina, and has a service territory which includes the metropolitan areas of Charleston, Columbia, Beaufort and Aiken and many other smaller cities, towns, and rural areas in the state. SCE&G is subject to the Commission's jurisdiction pursuant to S.C. Code Ann. § 58-27-10, *et seq.* This proceeding concerns a Combined Application filed under the Siting Act and the Base Load Review Act and includes a request for the establishment of revised rates as provided for in the Base Load Review Act. S.C. Code Ann. § 58-33-270(A)(2).

Pursuant to the Siting Act the Commission must determine:

1. The basis of the need for the facility. S.C. Code Ann; 58-33-160(1)(a);
2. The nature of the probable environmental impact. S.C. Code Ann. §58-33-160(1)(b);
3. That the impact of the facility upon the environment is justified, considering the state of available technology and the nature and economics of the various alternatives and other pertinent considerations. S.C. Code Ann. § 58-33-160(1)(c);

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4. That the facilities will serve the interests of system economy and reliability.
S.C. Code Ann. §§ 58-33-270(A)(2); 58-33-160(1)(d);
5. That there is reasonable assurance that the proposed facility will conform to applicable state and local laws and regulations issued thereunder, including any allowable variance provisions therein, except that the Commission may refuse to apply any local law or local regulation that is unreasonably restrictive. S.C. Code Ann. §58-33-160(1)(e);
6. That public convenience and necessity require the construction of the facility.
S.C. Code Ann. §58-33-160(1)(f).

In addition, pursuant to the Base Load Review Act (“the Act”) the Commission must issue findings that establish:

7. The reasonableness and prudence of the utility’s decision to proceed with construction of the plant considering the information available to the utility at the time. S.C. Code Ann. § 58-33-270(A)(1);
8. The anticipated construction schedule for the plant construction including contingencies. S.C. Code Ann. § 58-33-270(B)(1);
9. The anticipated components of capital costs and the anticipated schedule for incurring them, including specified contingencies. S.C. Code Ann. § 58-33-270(B)(2);
10. The return on equity for setting revised rates established in conformity with Section 58-33-220(16). S.C. Code Ann. § 58-33-270(B)(3);

11. The choice of the specific type of unit or units and major components of the plant. S.C. Code Ann. § 58-33-270(B)(4);
12. The qualification and selection of principal contractors and suppliers for construction of the plant. S.C. Code Ann. § 58-33-270(B)(5);
13. The inflation indices used by the utility for costs of plant construction, covering major cost components or groups of related cost components. S.C. Code Ann. § 58-33-270(B)(6);
14. The specific initial revised rates reflecting the utility's current investment in the plant. S.C. Code Ann. § 58-33-270(C); and
15. The rate design and class allocation factors to be used in calculating revised rates related to the plant. S.C. Code Ann. § 58-33-270(D).

In making these determinations, the Commission is mindful that a Base Load Review Order constitutes a “final and binding determination that a plant is used and useful for utility purposes” and that the plant’s “capital costs are properly included in rates” contingent only upon the construction of the plant within the parameters of “the approved construction schedule including contingencies; and . . . the approved capital costs estimates including specified contingencies.” *Id.* at § 58-33-275(A). According to the Act, “[s]o . . . long as the plant is constructed or being constructed in accordance with the approved schedules, estimates, and projections set forth in Section 58-33-270(B)(1) and 58-33-270(B)(2), as adjusted by the inflation indices set forth in Section 58-33-270(B)(6), the utility must be allowed to recover its capital costs related to the plant through revised rate filings or general rate proceedings.” *Id.* at § 58-33-275(C).

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This Order is the first base load review Order issued by the Commission. Consistent with the intent of the Base Load Review Act, the ORS has conducted an extensive audit and examination of SCE&G's decision to construct the Units and the contracts, designs, and permits under which they will be constructed. In doing so, the ORS relied on the expertise of its staff supplemented by outside consultants with extensive experience in power plant construction, construction contracting, resource planning, transmission planning, load modeling, economics, and environmental and nuclear permitting. As the record shows, this ORS team conducted a detailed audit and evaluation of all aspects of the Company's decision to proceed with construction of Units 2 and 3 and the plan for doing so, including the design and licensing of the proposed Units, and the Engineering, Procurement and Construction contract for their construction. Other parties have conducted similar reviews, and the Company has submitted extensive testimony from multiple witnesses concerning all aspects of the decision to construct these Units. At the hearing in this matter, the Commission heard from 22 witnesses including SCE&G's senior leadership and the experts sponsored by the ORS and the intervenors. The rulings that follow are based on the record produced as a result of this testimony and analysis.

III. SITING ACT FINDINGS

A. The Basis for the Need for the Facility

Under the Siting Act, the Commission must find and determine the "basis of the need for the proposed facility." S.C. Code Ann. § 58-33-160(1)(a). As Company President Marsh testified, SCE&G presently serves more than 640,000 electric customers

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in 24 counties in central and southern South Carolina. To meet the needs of those customers, SCE&G owns and/or operates ten coal-fired fossil fuel units (2,484 MW), one cogeneration facility (90 MW), eight combined cycle gas turbine/steam generator units (gas/oil fired, 1,319 MW), eighteen peaking turbines (347 MW), five hydroelectric generating plants (227 MW), one pumped storage facility (576 MW) and a two-thirds share (644 MW) of Unit 1 which it owns jointly with Santee Cooper. In 2007, the total net generating capability of all SCE&G facilities was 5,687 MW and its total supply capacity, when supplemented by two relatively small long-term purchases, was 5,745 MWs. This capacity was used to serve a 2007 peak demand of 5,248 MW, which resulted in an on-system reserve margin of approximately 9%. (Tr. II, p. 150, l. 3 – 6.) To serve its customers reliably, and to account for extreme weather, unanticipated plant outages, and forecast uncertainties, SCE&G must maintain a certain amount of capacity above its forecasted peak demand in reserve. SCE&G's established reserve margin target is 12% to 18% of forecasted peak demand, a target supported by the ORS's expert witness, George W. Evans.² (Tr. VI, p. 1338, l. 13 – 15; Tr. VIII, p. 2000, l. 22 and Hearing Exhibit 20, GWE-1.)

As set forth in Exhibit G to the Combined Application, and as testified to by Company witness Lynch, the Company forecasts that its firm territorial demand will grow 1.7% per year over the next 15 years. (Hearing Exhibit 12, JML-1, p. 1 – 3.) In his load forecast, Dr. Lynch assumed that future demand growth will be reduced or off-set by the new federal efficiency standards for heating and air conditioning units, new federal

² To provide the necessary reserve margin in 2009, SCE&G made short-term off-system capacity purchases to supplement the 9% in system reserve margin referenced above.

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standards for residential and commercial lighting efficiency, and by the expiration of current wholesale contracts with the Cities of Orangeburg and Greenwood and the North Carolina Electric Membership Corporation. (Tr. VI, p. 1334, l. 3 – 15.) For those reasons, Dr. Lynch's 1.7% demand growth forecast is substantially less than SCE&G's historical retail load growth of approximately 2.5% per year during the past 15 years. (Tr. VI, p. 1334, l. 7 – p. 1335 l. 22.)

Nevertheless, in light of anticipated demand growth, SCE&G's reserve margin will decline to 2% by 2016 unless new generating capacity is added before then. Adding the capacity represented by SCE&G's ownership portion of Unit 2 to the system in 2016 would increase SCE&G's reserve margin from 2% to 13% in that year. By 2019, the reserve margin would fall to -3.9% if no new generation has been added in the interim. Adding Unit 2 in 2016 and Unit 3 in 2019 would increase SCE&G's 2019 reserve margin to 16.8%.³ (Hearing Exhibit 12, JML-1, p. 1.)

Dr. Lynch and Mr. Marsh also testified that demand growth is only part of the need SCE&G seeks to meet by adding Units 2 and 3. According to these witnesses, for the past 12 years, the Company has met demand growth on its system by adding peaking and intermediate resources to its generation fleet. As a result, they testified that the Company now has a specific need to add additional base load capacity to its system. (Tr. II, p. 150, l. 14 – p. 160, l. 4; Hearing Exhibit 12, JML-2, p. 1 – 11.)

³ The reserve margins that Dr. Lynch forecasts with the additions of Units 2 and 3 are within SCE&G established range of target reserve margin. Even so, it is not unusual for the Company to exceed that target margin in years when new base load or intermediate capacity is added to SCE&G's system.

Some intervenors challenged the reliability of SCE&G load forecasts as a basis for assessing the need to construct Units 2 and 3. Those challenges included contentions 1) that load forecasts like Dr. Lynch's are generally too uncertain to support a decision as to the need for new capacity in 2016 and 2019; 2) that Dr. Lynch's load forecasts do not suitably account for additional Demand Side Management ("DSM") related reductions in load growth that may occur in the future; and 3) that it is imprudent to rely on current load forecasts in light of the sharp economic downturn that the nation is currently experiencing. Certain of the intervenors also challenged the Company's testimony indicating that it has a specific need for base load generation in the 2016 and 2019 time period. Each of these challenges is discussed below.

1. The General Reliability of SCE&G's Load Forecasts

The ORS's expert witness, Dr. Zhu, testified that SCE&G's load forecasts incorporate extensive economic data and analysis and are based on data and methodologies that are consistent with accepted industry standards and practices. (Tr. VIII, p. 1967, l. 7 – 13.) As part of the ORS audit of the Company's filing, Dr. Zhu conducted a detailed review and analysis of Dr. Lynch's forecasts. To measure the accuracy of these forecasts, Dr. Zhu compared Dr. Lynch's forecasts over the past seven (7) years with actual growth rates on SCE&G's system. (Tr. VIII, p. 1967, l.14-l.21; Hearing Exhibit 19, ZZ-3.) He also compared SCE&G's forecasted demand growth rates with the forecasted demand growth rates of other utilities in the region. (Tr. VIII, p. 1963, l. 11 – 13.) Dr. Zhu's conclusion was that Dr. Lynch's forecasts are reasonable. (Tr. VIII, p. 1970, l. 16-17.) Dr. Zhu stated that in determining need, SCE&G forecasted

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total energy sales growth and peak demands. Over the next 15 years, from 2008 to 2022, according to the Company's May 2008 update to its Integrated Resource Plan, total energy sales growth is forecast to grow an average of 1.3% per year, and the firm territorial summer peak and winter peak demands are projected to increase at 1.7% a year. (Tr. VIII, p. 1963, l. 5-8.) Dr. Zhu also concluded that the resulting load growth rates for SCE&G are consistent with the forecasts of other regional utilities. (Tr. VIII, p. 1963, l. 11 – 13.) The FOE assertion that much has happened since the Company's IRP issuance may be factually true, but this Commission believes that the Company's forecasting makes allowances for these occurrences, as discussed below.

Dr. Zhu concluded that Dr. Lynch's current forecast tends to take a conservative approach to measuring demand growth. For instance, the current forecast does not assume that any wholesale load will replace the wholesale contracts with the City of Orangeburg, the City of Greenwood and the North Carolina Electric Membership Corporation that will expire during the planning period. Dr. Zhu's opinion is further supported by Company witness Marsh's testimony that current forecasts do not assume that any new electric technologies or applications like electric vehicles place substantial loads on the system. (Tr. VIII, p. 1965, l. 15 – 1.19; Tr. VIII, p. 1968, l. 3 – 11; *see also* Tr. II, p. 159, l. 5 – 16.) The 1.7% demand growth rate that Dr. Lynch derived from these forecasts is 35% less than historical growth rates for the prior 15 year period. As Dr. Zhu testified, the conservative nature of these assumptions creates results that tend to understate the need for Units 2 and 3 rather than overstate that need. (Tr. VIII, p. 1968, l. 3 – 4.)

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The reasonableness of Dr. Lynch's load forecast was also supported by Mr. Marsh who testified from an operational standpoint concerning the growth that the Company has experienced during the last 12 years. Mr. Marsh testified that SCE&G serves some of the most rapidly growing areas in South Carolina. According to his testimony, over the past twelve years, SCE&G has added some 149,000 new customers, which amounts to a 31% percent increase. (Tr. II, p. 153, l. 15 – 17.) Net of retirements, SCE&G installed 2,413 miles of new overhead line, 3,014 miles of new underground line, 86,065 new distribution transformers and 139,988 new service poles on its system since 1996. (Tr. II, p. 153, l. 17 – 20.) Mr. Marsh testified that while territorial growth rates may be slowed by the current economic downturn, the areas SCE&G serves will continue to be attractive places for residential and commercial growth in future years, and growth is anticipated to continue over the long term. (Tr. II, p. 188, l. 9 - 20.)

Certain of the intervenors, and FOE Witness Brockway, argued that inaccuracies in utility demand forecasts in the 1960s and 1970s led to an overbuild in base load capacity during that period. (Tr. III, p. 417, l. 5 – 8.) They contended that the Company's current demand forecasts should be discounted in light of past forecasts, and that the Company's application should be denied. However, the intervenors produced no specific evidence or expert analysis indicating that Company's current load forecasts are inaccurate in any specific way. The intervenors did not rebut Dr. Zhu's testimony concerning the detailed review and analysis he conducted of Dr. Lynch's forecasts, nor did they conduct any such review themselves.

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The record shows that the forecasting errors of thirty years ago were based on specific conditions that are not present today. Specifically, thirty years ago, utilities were projecting compound growth rates of 6% -7%. (Tr. III, p. 310, l. 12 – 20.) Current demand projections are much lower, and are driven by new customers coming on the system more than by assumptions of increased power consumption by existing customers as were the forecasts in the 1960s and 1970s. (Tr. III, p. 310, l. 21 – p. 311, l. 4; Tr. VI, p. 1353, l.4 – l.10.) The record does not support the conclusion that SCE&G's current forecasts are subject to the same sorts of errors as were contained in demand forecasts of thirty years ago.

2. Accounting for Future DSM Effects

Several of the intervenors suggested that Dr. Lynch's forecasts were inaccurate because they failed to take into account the possible reductions in demand growth due to future DSM programs and increased conservation efforts by customers. The record, however, shows that SCE&G has included substantial reductions in demand due to current and forecasted DSM efforts in its forecasts, and that its resource plans provide room for increased DSM contributions even if Units 2 and 3 are built. (Tr. II, p. 165, l. 8 - p.169, l. 5; Tr. VI, p. 1335, l. 4 – p. 1336, l. 7; Tr. VI, p. 1350, l. 16 – p. 1353, l. 16; Tr. VI, p. 1361, l. 13 – 18.)

There are two principal types of DSM programs. Demand reduction DSM programs involve efforts to shift use of power away from peak periods. By shifting the time of energy use, such programs reduce the growth in the utility's peak demand. Energy efficiency programs involve efforts to reduce customers' overall energy

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consumption. Depending on the appliance or end use involved, energy efficiency programs may or may not materially affect peak demand.

a. Demand Reduction Programs

As Dr. Lynch testified, SCE&G has a very active demand reduction program which includes its interruptible load program, its standby generation program, its real time pricing program and its time-of-use rates. These programs are currently reducing SCE&G's peak demand by approximately 200 MW or by more than 4%. (Tr. VI, p. 1346, l. 15 – 18.) Dr. Lynch provided data showing that this 4% reduction is well above industry standards for utilities in this region, and above the national average, which is between 2% and 3%. (Hearing Exhibit 12, JML-2, p. 5, Tr. VI, p. 1347, l. 1-7.) In addition, SCE&G uses two major generation sources, its Fairfield Pumped Storage Plant (576 MW) and Saluda Hydro (206 MW) as peak shaving units. The use of these units further flattens SCE&G's peak demand and reduces the need for additional capacity on its system to serve customers' peak requirements. (Tr. VI, p. 1347, l. 1 – 7; Tr. VI, p. 1377, l. 19-22.)

However, as Dr. Lynch testified, demand-related DSM programs can reach a point of diminishing returns as existing programs flatten peak demand and customers have to be interrupted for longer and longer periods to move their loads outside what has become a longer peak period. (Tr. VI, p. 1346, l. 15 – p. 1349, l. 11.) Dr. Lynch testified that given SCE&G's load shape, and the current level of participation in demand response programs, customers would need to agree to be interrupted for a total of two weeks a year to remove another 100 MW of demand from the system. (Tr. VI, p. 1348, l.

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1 – 7.) In addition, as the required time of interruption is extended, the ability of the utility to rely on customers remaining on the program for the long term and interrupting or deferring their energy use as agreed is reduced.

b. Energy Efficiency Programs

The other category of DSM programs is energy efficiency programs. Like other utilities regulated by this Commission, SCE&G embarked on extensive energy efficiency programs in the 1980's but these programs were significantly scaled back, with Commission approval, in the 1990's.

Currently, SCE&G has two categories of energy efficiency programs: customer information programs and energy conservation programs. (Tr. VI, p. 1349, l. 14-15.). SCE&G's customer information programs include its Annual Energy Campaign which seeks to educate the company's customers about energy efficiency, and World Wide Web ("Web") based services programs which allow customers to analyze their individual consumption patterns. (Tr. VI, pp. 1350, l. 3-8.). Dr. Lynch testified that 174,000 SCE&G customers are registered for Web based account access; and 20% of commercial consumption is provided under time-of-use or real-time-pricing rates. (Tr. VI, pp. 1350, l. 20-1351, l. 3-4.).

FOE argues in its brief that Company "information only" programs do not represent a serious attempt to reduce customer usage or peak, and that information alone is typically not enough to motivate a choice of the alternative. (FOE Brief at 16.) Further FOE opines that registering for internet access to obtain efficiency guidelines does not tell us what actions the customers have taken that have saved kilowatt hours, nor does the

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fact that 20% of commercial sales are made on TOU or RTP rates demonstrate that customers taking service on these rates have done anything to achieve greater efficiency or move load off peak. (Id.)

We believe that SCE&G could have done more in general with its energy efficiency programs in the past, especially in regard to expansion of residential energy efficiency programs, and also believe that the Company is committed to improving its effectiveness going forward. However, action by customers must first start with obtaining the information on DSM methodologies. The availability of TOU or RTP rates gives consumers the wherewithal to be both more efficient in their use of energy, and to move load off-peak. Without the provision of information on the availability and use of these rates, customers simply cannot reduce usage or shift usage to off-peak hours. We note that the Company is hiring additional energy auditors to perform residential audits, and instituting further studies and programs which would aid residential and commercial consumers in energy saving methodologies. We expect that gains will be made in effectively communicating information on the DSM programs. (Tr. VI, p. 1351, l. 12-13.)

Also like other utilities, SCE&G is in the process of revitalizing its energy efficiency programs in light of current energy prices, general economic conditions and the increased environmental concerns of its customers. As discussed below, SCE&G's witnesses testified that the Company is conducting a comprehensive study of potential new DSM offerings and is preparing to present a new suite of DSM programs for Commission review and approval in 2009. (Tr. VII, p. 1562, l. 13 – 20.)

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Certain of the intervenors contend that the Company's demand forecasts cannot be relied on to predict future load until the effects of these new DSM programs can be evaluated. However, as discussed above, SCE&G's outside energy efficiency consultant Mr. Pickles testified that significant demand reductions due to the effects of current energy efficiency and demand reductions programs are already embedded in Dr. Lynch's forecasts.⁴ (Tr. VII, p. 1564, l. 4 – 19; Tr. VII, p. 1612, l. 15 – 22; *see also*, Tr. VI, p. 1357, l. 12 – 22.) In addition, Dr. Lynch's forecasts were adjusted to include a further 5% reduction in retail sales over the period 2011-2019 due to anticipated increases in the efficiency of heating and air conditioning units and residential and commercial lighting. (Tr. VI, p. 1358, l. 10 – 16; Tr. VII, p. 1612, l. 15 – 22.)

In response to the intervenors' claims, Dr. Lynch modeled SCE&G's future load assuming an additional 0.50 percentage point reduction in annual energy demand growth per year due to additional DSM programs. He found that this reduction had no material effect on the need for Units 2 and 3. (Tr. VI, p. 1358, l. 5 – 7.) By comparison, utilities in the Southeast averaged only a 0.16 percentage point reduction in energy demand growth due to DSM programs in 2006. (Tr. VI, p. 1382, l. 10 - 12.) As both Dr. Lynch and Mr. Pickles testified, the available data and analysis all indicate that the achievable reduction in demand growth from increased energy efficiency programs will not

⁴ In this regard, it should be noted that the 209 MW savings listed as the DSM contribution to meeting peak requirements in the SCE&G Integrated Resource Plan ("IRP") represents only the supply-side contribution to meeting demand represented by the amount of load that SCE&G interrupts on short notice to meet its capacity reserve requirements during system peaks. In other words, the 209 MW is that portion of interruptible load that can be counted as a *generation resource* available to meet peak load. Energy efficiency programs reduce system demand and are embedded in the load forecast that is part of the IRP analysis.

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materially change the forecasted need for Units 2 and 3. (Tr. VI, p. 1358, l. 5 – 7; Tr. VII, p. 1564, l. 17 - 19.)

Based on the evidence cited above, the Commission finds that additional savings due to DSM programs are not a viable substitute for the base load capacity that SCE&G seeks to build. Contrary to the testimony of FOE witness Brockway, who opined that the Company had failed to adequately consider DSM in its planning, (Tr. III, p. 364, l. 17-19.), the Commission finds Dr. Lynch's forecasts and analyses have properly accounted for or analyzed the potential for additional DSM-related savings. Moreover, SCE&G's resource plans contain room for additional DSM related energy savings even with the addition of Unit 2 and 3 to the system. DSM is a useful supplement to the generation capacity needed on SCE&G's system. It is not a substitution for it.

c. SCE&G's Commitment to Expanded DSM Programs

The Company's Witness Mr. Pickles testified in detail concerning the scope and methodology of the "bottom up" DSM program analysis that he is presently performing for SCE&G along with SCE&G's DSM organization. As Mr. Pickles testified, the analysis includes the following:

- An assessment of currently-available DSM data specific to SCE&G's service territory and a gap analysis to identify critical information needs,
- The identification of a broad range of potential DSM measures and programs based on a national review of DSM programs and best practices,

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- The determination of the peak demand and energy impacts of the most promising DSM measures based on a detailed evaluation of service territory-specific building practices, efficiency levels, weather, and operational characteristics using detailed hourly computer simulation models,
- The estimation of the current and future penetration of energy efficiency measures and their cost, including evaluation of free-ridership,
- The forecasting of the potential impact of the DSM programs using a variety of scenarios concerning incentive levels and program effectiveness,
- A benchmarking of results against the actual experience of other utilities and against other studies of the potential for DSM performed in other jurisdictions, and
- The development of DSM's supply curves and the analysis of the appropriate type, scale, and timing of future DSM programs in an integrated analysis alongside potential supply-side alternatives.

(Tr. VII, p. 1563, l. 1 – 23.)

SCE&G's President, Mr. Marsh, affirmed the Company's commitment to complete this thorough and comprehensive review of potential DSM programs and to bring the results to the Commission in 2009. (Tr. III, p. 297, l. 18 – p. 298, l. 10.) The Commission believes that these initiatives by the Company are critical to the energy

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future of the state, as well as the economic well being of its consumers, and directs the Company to complete a comprehensive and thorough DSM analysis along the lines that Mr. Pickles outlined and to present the findings and proposals for expanded DSM offering to the Commission for review no later than June 30, 2009.

FOE argues that the Company should ask whether additional DSM could contribute to a plan that could replace the 1,229 MW of nuclear power the Company has decided is the best option. (Tr. III, p. 377, l. 10-20.) For instance, FOE uses California as an example, stating California has held its per capita consumption of electricity to roughly 7,000 kWh from 1975 through 2004, compared to the growth from 8,000 kWh to 12,000 kWh in the national average electricity consumption over the same period. (Tr. III, p. 378, l. 13-16.) SCE&G responded that FOE failed to mention that the price for power in California has increased at a faster rate than the national average and that today the residential price for power is more than 30% higher than the national average. (Tr. VI p. 1380, l. 11-14.) SCE&G compared a yearly bill for a single family residence under its rates assuming yearly usage of 18,500 kWh with a yearly billing California assuming the same usage. (Id.) A customer in SCE&G's territory would pay approximately \$2,064 yearly under SCE&G's current approved rates while a California customer would pay approximately \$4,258 under Pacific Gas & Electric rates, \$3,171 under Southern California Edison rates and \$3,628 under San Diego Gas & Electric rates (Tr. VI, pp. 1380, l. 18-1381, l. 1.) SCE&G asserted that with such higher rates, more DSM programs can be cost justified. (Tr. VI, p. 1381, l. 2-3.) During the hearing on this matter, FOE witness Brockway agreed that California historically has had higher rates and

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continues to have higher rates. (Tr., Vol. III, p. 504, l. 1-3.) SCE&G also asserted that California's levelized electricity consumption is likely to be as much the result of high costs for electricity as the effectiveness of DSM programs. (Tr. VI, p. 1381, l. 3-7.) FOE witness Brockway acknowledged that many of the utilities with reductions in energy sales attributable to DSM savings have residential prices for energy that are significantly higher than the average retail price in South Carolina. (Tr. III, p. 478, l. 20-22. See also Composite Hearing Exhibit 1, Exhibit NB-3.) Mrs. Brockway's Exhibit NB-3 shows annual DSM Energy Savings but it fails to reflect the incremental effects for both energy and peak demand impact. (See Hearing Exhibit 25 showing peak demand reduction from DSM.) Incremental effects are impacts on energy and peak demand from new programs and new customers.

FOE cites ORS witness Evans as having acknowledged "the Company's flawed and inadequate DSM program," by quoting the witness as saying that the ORS panel was "very critical of the company's DSM efforts." (Tr. IX, p. 2255, l. 10-12.) However, Evans also testified that the Company "has responded to that very well" to the criticism with its plans for future programs. (Id.)

3. Effects of the Current Economic Downturn on Load

Certain of the intervenors contend that are not reliable due to the current economic downturn. However, Dr. Lynch testified that he has continued to update his load growth forecasts to include the current economic data and forecasts up to the time of the hearing. (Tr. VII, p. 1539, l. 14 – p. 1541, l. 2.) He did so using the economic data and forecasts that the Company regularly receives from national economic consulting

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firms. Id. Dr. Lynch testified that this updated analysis showed that the impacts of the current economic downturn on load growth forecasts, while potentially significant in the near term, have only a minor impact on the load forecasts for 2016 and 2019, and that these impacts do not change the forecasted need for Units 2 and 3. (Tr. VII, p. 1540, l. 4 - 7.) He also testified that he analyzed the load growth patterns on SCE&G's system during and after major recessions over the past 30 years. The data shows that load growth on SCE&G's system slowed but did not stop even during the most severe of the historic recessions. When these past recessions ended there was an accelerated growth in load that offset much of the effect of the earlier growth reduction. (Tr. VII, p. 1539, l. 2 – p. 1542, l. 25.)

While the current economic downturn is a matter of concern to all South Carolinians, it is important that long-term infrastructure projects needed to meet the state's future energy demands not be shelved too quickly. To prosper and compete in global markets in the future, South Carolina will need efficient, reliable energy sources. The generation capacity SCE&G now seeks to build will take 12 years to complete and will serve the state for as many as 60 years thereafter. The Commission agrees with Company witness Addison who testified that long-term decisions related to energy capacity should be based on the long-range needs of the system and the state economy, not shorter-term considerations.

4. Flexibility to Respond to Changes in Demand or Supply

An important consideration in assessing the need for Units 2 and 3 is their benefit to the system even if the demand or supply patterns are different than forecasted. It is

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possible that demand on SCE&G's system may grow faster than anticipated. If so, the benefits from choosing to build Units 2 and 3 at this time are likely to be greater than anticipated. But the record also shows that if DSM measures, alternative energy sources or adverse economic conditions reduce SCE&G's load capacity requirements significantly below forecast, Units 2 and 3 will still be quite valuable. Witness Marsh testified that at present 64% of SCE&G's base load capacity is in plants that were built between 1953 and 1973. (Tr. II, p. 158, l. 15 - 17.) These plants will be on average more than 50 years old by 2019 and may require substantial capital investments to meet reliability requirements and increasingly stringent environmental regulations. (Tr. II, p. 158, l. 17 - 18; p. 160, l. 20 - 22.) If load growth is slower than expected, adding Units 2 and 3 may allow SCE&G to reduce its reliance on its aging fleet of coal-fired plants, and perhaps even retire some of the less efficient plants. (Tr. VI, p. 1392, l. 9 - 13.) Allowing these older plants to be retired or used less intensively in the future could benefit the system in terms of reliability, environmental compliance and fuel efficiency. The evidence indicates that the capacity represented by Units 2 and 3 will provide useful flexibility for SCE&G's generation in the future. Units 2 and 3 can provide significant benefits to SCE&G's system even if load growth during the coming decades is substantially below forecast.

5. The Company's Need for Base Load Capacity

Certain of the intervenors challenged the testimony of Dr. Lynch and Mr. Marsh that the Company has a specific need for base load capacity in the 2016-2019 time period. As the testimony of record indicates, base load capacity is fuel efficient

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generating capacity intended to run for thousands of hours a year and at high capacity factors. (Tr. II, p. 187, l. 22 – p. 188, l. 8.) Such plants are the foundation upon which an electric system operates and on which it relies for the majority of the energy used to serve customers. (Tr. II, p. 151, l. 8 – 13; Tr. II, p. 188, l. 3 – 8.) Peaking and intermediate units are intended to run for substantially fewer hours per year. (Tr. II, p. 152, l. 3 – 8.)

As Mr. Marsh testified, SCE&G last added a base load resource to its electric system when Cope Station went into commercial operation in 1996. (Tr. II, p. 155, l. 9 – 11.) Since that time, energy use on SCE&G's system has grown by 31%. (Tr. II, p. 155, l. 14 – 15.) By 2016, energy use on SCE&G's system is forecasted to have grown by a total of 44%. (Tr. II, p. 155, l. 15 – 17.)

Current operating statistics demonstrate the importance of base load generation to serving customers' energy needs. During 2007, base load plants constituted 56% of SCE&G's generation capacity. (Tr. II, p. 158, l. 6 – 7.) However, they produced over 80% of the energy used by SCE&G's customers during that year. Base load capacity—which represented 75% of SCE&G's generating capacity in 1996—is forecasted to drop to 45% as a share of total generation capacity by 2020 unless new base load resources are added in the interim. (Tr. II, p. 158, l. 9 – 12.)

Company witness Lynch notes that, in its application, the Company stated that it would take approximately 10,276 MWs of solar panels covering 61,656 acres or 6,852 MWs of wind turbines covering 120,192 acres to produce an amount of electric energy equivalent to that of 2,234 MWs of nuclear capacity represented by the two plants under question. FOE argues that the Company is merely setting up a “straw man” by estimating

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the amount of alternative energy generating facilities that would be required to displace 2,234 MW of generation in such a way that would exclude all generation but base load. We understand that FOE and some of the intervenors are not arguing that alternative energy can fulfill all of the state's future generation needs. However, Dr. Lynch's exhibit does illustrate how difficult it would be to produce this amount of clean energy from another resource. (Tr. VI, pp. 1373, l. 13-1374, l. 4) Based on the foregoing, the Commission finds that the record supports the Company's testimony that the specific capacity need for 2016 and 2019 is most reliably and efficiently met through the addition of new base load capacity to its system. Units 2 and 3 represent such capacity.

6. The Single Unit Proposal

Certain of the intervenors suggested that the Commission should authorize SCE&G to build one new nuclear unit but not two. The record, however, does not support this proposal as being reasonable, economical or prudent. (Tr. III, p. 570, l. 13-21.) All U.S. utilities that have selected AP1000 units have opted to license and construct two units per site. As the record shows, the price SCE&G received from Westinghouse/Stone & Webster was premised on construction of two units in sequence, and substantial cost savings are included as a result. (Tr. II, p. 278, l. 23 – p. 279, l. 6.) The construction of two units allows SCE&G to partner in this project with Santee Cooper on a 55%-45% basis, spreading risk in the project, and providing a benefit to the state's electric cooperatives and their customers. As a result, SCE&G will only own the equivalent of 1.1 complete units when the construction of both Units is finished. If the Commission were to deny SCE&G the authority to proceed with construction of the

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second unit, the first unit will have to be re-priced and the price per KW of that unit will rise by a significant amount. (Tr. II, p. 162, l. 9 – 16.) There is no assurance that a new EPC contract could be successfully negotiated for one plant at terms that would benefit SCE&G's customers.

Approving only one unit would place SCE&G in the position of paying a higher cost per KW for the capacity it builds and building only half of the capacity that it will need in the next 12 years. For these reasons, the Commission finds that approving only one unit would not be reasonable, economical or prudent as compared to approving two units as proposed by SCE&G.

7. Conclusion as to Need

Having carefully reviewed the evidence of record in this proceeding, the Commission finds that the load forecasts presented by Dr. Lynch and reviewed and audited by ORS Witness Dr. Zhu provide a reliable and appropriate basis for assessing the need for Units 2 and 3. The Commission finds that the Company has in fact demonstrated the need for the Units and the need to proceed with their construction.

B. Nature of the Probable Environmental Impacts

The second finding and determination required by the Siting Act is a finding as to the "nature of the probable environmental impact" of Units 2 and 3. S.C. Code Ann. § 58-33-160(1) (b). As the record shows, Units 2 and 3 will be constructed on the site of an existing nuclear generating station whose environmental conditions have been closely monitored for over 30 years. (Tr. X, p. 2479, l. 4 – 10; Hearing Exhibit 30, SJC-3.) In addition, the environmental conditions at the site have been evaluated in detail at least

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three times: in the initial NRC licensing of Unit 1, in the recent NRC license renewal for Unit 1, and in preparation of the environmental report that was provided to the NRC as part of the Company's Combined Operating License Application ("COLA") for Units 2 and 3. (Tr. X, p. 2479, l. 4 – 10; Tr. X, p. 2523, l. 12 – 20.)

Company witnesses Steven Connor and Stephen Summer testified concerning the most recent environmental report and its conclusions. That report is over 1,100 pages long and represents the work of over 25 major contributors and over 25,000 hours of work by environmental experts and others. (Tr. X, p. 2417, l. 3 – 10.) The report examined a comprehensive list of possible environmental impacts of the plant and provided a detailed analysis of Site and Vicinity Land Use; Air Quality; Water Quality; Water Quantity and Use; Terrestrial Ecosystems; Aquatic Ecosystems; Threatened and Endangered Species; Historic and Cultural Resources; and Transportation. (Tr. X, p. 2431, l. 1.) The report specifically examined the likely radiological impacts of the plant and the provisions for the storage and disposal of low-level wastes and spent fuel assemblies. (See generally, Tr. X, pp. 2436 – 2446.)

The report concluded that the impact of the plant on each of the areas enumerated above would be "small," which is defined as environmental effects which are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource. (Tr. X, p. 2447, l. 14 – 15.) The only exception was in the area of transportation. The report concluded that the effect of the Units on traffic patterns in the vicinity of the Units would be small to large, with the greatest impact due to the increased road use in the area caused by construction traffic but would be moderate

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during the operation of the facility. (Tr. X, p. 2448, l. 1.) Moderate impacts are defined as environmental effects which are sufficient to alter noticeably, but not to destabilize any important attribute of the resource. (Tr. X, p. 2418, l. 16 – 18.) Large impacts are defined as environmental effects which are clearly noticeable and are sufficient to destabilize sufficient to alter noticeably, but not to destabilize any important attribute of the resource. SCE&G had indicated that it will work with the Department of Transportation (“DOT”) to mitigate the impact that traffic and transportation activities will have on the area.

ORS Witness Crisp testified concerning ORS’s review and audit of this environmental information. (Tr. VII, p. 1916, l. 4 – p. 1919, l. 15.) ORS witness Crisp testified that SCE&G had fulfilled its obligation for filing its environmental report with the NRC and had established a protocol to address the necessary permitting from state and federal agencies to protect the South Carolina environment, and he supported the conclusion that the environmental effects of the plant would be as set forth in that report. (Tr. VIII, p. 1919, l. 8 – 15.)

At the hearing, FOE contended that the analysis did not properly account for the environmental concerns related to the long-term disposal of spent fuel from the facility. The record, however, shows that the facility has capacity in its spent fuel storage pool to store the spent fuel assemblies generated by 18 years of operations. (Tr. III, p. 613, l. 7 - 10.) In addition, the Company plans to construct a dry cask storage facility in the near future to store spent fuel from Unit 1. (Tr. III, p. 613, l. 10 – 13.) The facility would be

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designed to accommodate or to be expanded to accommodate spent fuel from Units 2 and 3 when their spent fuel pools are filled. (Tr. III, p. 613, l. 13 – 16.)

As the record indicates, dry cask storage is a means to store spent fuel assemblies which have been held in the spent fuel pool for five years or more to allow the radioactivity levels in them to decay to acceptable levels. These fuel assemblies are placed into heavy stainless steel containers that are welded shut and placed into a concrete overpack which is also sealed. (Tr. III, p. 614, l. 2 – 10.) The resulting cask can then be stored for an virtually indefinitely period either on a pad above ground or below ground in a shallow concrete silo. (Tr. III, p. 614, l. 8 – 10.) Other than fencing and site security, the casks require no maintenance or upkeep and do not emit levels of radiation that require special precautions. (Hearing Exhibit 30, SJC-3.) Within the casks, radiation levels continue to degrade as the assemblies are stored. (Tr. III, p. 614, l. 2 – 10.)

Dry casks provide long-term storage for spent fuel assemblies but do not constitute permanent repositories for them. However, as the Company points out, the long-term disposal of spent fuel assemblies is a statutory responsibility of the federal government. *See* the Nuclear Waste Policy Act of 1982, 42 U.S.C. § 10101 *et seq.*, 42 U.S.C. 10131(b)(1), 10 C.F.R. §961.11. As the record indicates, the U.S. Department of Energy must enter into an agreement to take ultimate responsibility for the fuel as a condition of the NRC issuing a license for the Units. (Tr. X, p. 2460, l. 16 - 19.) As the record also indicates, the federal Department of Energy is proceeding with licensing of the Yucca Mountain repository as a long-term site for such fuel assemblies. (Tr. IV,

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p. 740, l. 5.) The license application for the facility has recently been submitted to the NRC.

With regard to radioactive solid waste, SCE&G witness Connor testified that the facility operations should not result in any high-level or transuranic radioactive wastes. (Tr. X, p. 2440, l. 20-21.) If so, Connor testified that the U.S. Department of Energy will dispose of the fuel. (Id.) The facility, however, will generate low-level radioactive waste and spent nuclear fuel (“SNF”). (Tr. X, p.2440, l. 11-12.) Connor stated the procedures and disposal methods currently utilized for the radioactive waste disposal of the existing nuclear unit will also be utilized for the new units. (Tr. X, p. 2440, l. 12-14.) Low-level radioactive waste is stored on-site on an interim basis before being shipped to a permanent disposal facility. (Tr. X, p. 2440, l. 16-17.) FOE challenged the storage facilities by arguing there is no long-term storage solution (Tr. X, p. 2591, l. 16-25.) SCE&G witness Connor testified that until the federal government takes possession of the spent fuel, SCE&G will store the spent fuel as it currently does with its existing unit by utilizing spent fuel pools and dry cask storage. (Tr. X, p- 2592, l. 5.) FOE questioned the safety of utilizing dry cask storage for a number of years. (Tr. X., p. 2598 l. 18-21.) SCE&G witness Connor responded by stating the dry cask storage facilities will be maintained. (Tr. X, p. 2598, l. 22-24.)

For the Commission to find that long term disposal of spent fuel assemblies constitutes a negative environmental impact of Units 2 and 3, it would have to conclude that the federal government cannot or will not meet its statutory responsibilities. We decline to do so. The Commission presumes that the federal government will honor its

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commitment to store spent fuel, and no convincing evidence has been presented that it will not do so.

Similarly, FOE challenged the environmental record of the Barnwell low-level nuclear waste disposal facility as posing a potential environmental problem with the siting of Units 2 and 3. The Barnwell facility accepts low-level waste only from generators in South Carolina, New Jersey and Connecticut, and would accept low-level nuclear waste from the proposed Units 2 and 3. (Tr. IV, p. 750, l. 12 – p. 751, l. 9.) Additional facilities exist in other states, and new facilities are being permitted at this time. (Tr. IV, p. 751, l. 20 – 21; Tr. X, p. 2440, l. 16 – 19.) The Barnwell facility is extensively regulated by the DHEC. (See S.C. Code Ann. § 13-7-40 *et seq.*; S.C. Regs 61-63.) The purpose of that regulation is to ensure that this facility complies with applicable environmental regulations such that its activities do not result in injury to the environment of the state of South Carolina. There is no basis on this record for the Commission to find that DHEC will not fulfill its legal duties, or that the potential use of the Barnwell facility constitutes a negative environmental impact of building Units 2 and 3 that might prevent those units being approved by this Commission under the Siting Act.

C. Justification of the Impact on the Environment

The third finding and determination required by the Siting Act is whether “the impact of the proposed facility is justified considering the state of available technology and the nature and economics of the various alternatives and other pertinent considerations.” S.C. Code Ann. § 58-33-160(1)(c). The environmental report concluded that wind, solar, biomass and hydro generation were not feasible alternatives to nuclear or fossil fired

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generation. As to solar and wind generation, the environmental report concluded that these energy sources would have greater environmental impacts than nuclear given the amount of area that would need to be dedicated to them and the new transmission facilities they would require. (Tr. X, p. 2450, l. 5 – 8.) For purposes of the environmental assessment, coal and gas generation were identified as the principal alternatives to nuclear generation. Both coal and gas alternatives were found to have significantly greater environmental impacts than Units 2 and 3, due principally to significantly higher air emissions, specifically the amount of additional CO₂, nitrous oxides, SO₂ and particulates that would be emitted by either gas or coal generation. (Hearing Exhibit 30, SJC-3.) The environmental report concluded that from an environmental standpoint, nuclear generation was the best alternative for meeting the energy needs of SCE&G's customers with the least impacts on the environment. (Tr. X, p. 2450, l. 13 – 15.) The Commission finds that this conclusion is amply supported on the record.

D. Contribution to System Economy and Reliability

The fourth finding required by the Siting Act is whether the Units “will serve the interests of system economy and reliability.” S.C. Code Ann. § 58-33-160(1) (d).

1. System Economy

In evaluating the contribution of Units 2 and 3 to system economy, the Commission is required to assess a) the projected cost of power to SCE&G's customers if Units 2 and 3 are built, as compared to b) the comparable cost to customers if alternative means of meeting demand are chosen. This analysis properly includes an assessment of all the costs of power from Units 2 and 3 and all the costs of power from the most

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competitive alternative supply resource or resources. The relevant costs include capital costs, operating and maintenance costs, fuel costs and environmental compliance costs. This competitive economic evaluation also properly includes an evaluation of the needs, condition and operating requirements of SCE&G's electric system as a whole, as well as the abilities of various supply scenarios to respond to uncertainties in such things as aggregate future fuel costs and environmental compliance costs.

SCE&G selected Units 2 and 3 as the appropriate resources to meet its 2016 and 2019 energy needs based on analyses performed by its Resource Planning Group over the period 2005-2008. (Tr. II, p. 160, l. 11 – p. 161, l. 6.) Those analyses compared the cost to customers from resource plans based on adding Units 2 and 3 to three principal alternative plans; 1) plans that relied on two coal generation plants of similar capacity to SCE&G's ownership portion of Units 2 and 3 supplemented by simple-cycle gas peaking units, 2) plans that relied on adding one, two or three units of combined-cycle gas generation supplemented by simple-cycle gas peaking units, and 3) plans that relied on simple-cycle gas peaking units exclusively. (Tr. VI, p. 1353, l. 22 – p. 1354, l. 9.) Based on these analyses, the Company determined that constructing Units 2 and 3 provided the best contribution to system economy of any alternative. (Tr. VI, p. 1358, l. 5 - 7.)

In conducting these analyses, the Company first performed a base case analysis which evaluated these four alternative supply scenarios using a consistent set of assumptions related to future fuel costs, environmental compliance costs and other costs. (Tr. VI, p. 1355, l. 7 – p. 1356, l. 8.) The Company then conducted sensitivity analyses in which these four competing generation plans were analyzed under varying

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assumptions related to these costs. As Company witness Marsh testified, the Company's evaluation of these four alternatives also included a qualitative assessment of the alternatives against the strengths and weaknesses of the Company's current generation fleet, the operating needs of the electric system and the environmental compliance cost risks, fuel cost risks and operational risks inherent in SCE&G's current generation mix. (Tr. II, p. 170, l. 17 - p. 175, l. 2.)

As Mr. Marsh and Dr. Lynch testified, Units 2 and 3 emerged as the Company's preferred capacity option in each of these analyses, *i.e.*, the base case analysis, the sensitivity analysis and the qualitative analysis. (Tr. II, p. 170, l. 4 – 14; Tr. VI, p. 1355, l. 7 – p. 1357, l. 7.) The ORS reviewed and audited these analyses, and ORS Witness Evans testified that they considered reasonable alternatives, and arrived at what will likely be the most economical plan for meeting SCE&G's base load generation needs. (Tr. VIII, p. 2002, p. 21 – p. 2003, l. 2.)

As Dr. Lynch and Mr. Marsh testified, the quantitative analysis of capacity options principally focused on the relative cost of those units compared to coal or combined cycle gas generation. (Tr. II, p. 164, l. 19 – p. 165, l. 3; Tr. VI, p. 1353, l. 18 – p. 1354, l. 9.) As Dr. Lynch's and Mr. Pickles' testimony shows, and as will be discussed more fully below, wind, solar, biomass and DSM programs were evaluated by the Company but did not emerge as competitive alternatives to nuclear, coal or natural gas fired generation. (Tr. VII, p. 1607, l. 14 – p. 1608, l. 14; Tr. VI, p. 1339, l. 8 - 12.) (The contribution that DSM programs can make to system supply needs is by limiting demand growth and is discussed in the preceding section of this order.)

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The Company maintains that it did not intend to minimize the role that wind, solar, biomass and DSM programs could play as a supplement to additional base load capacity in meeting future energy needs. SCE&G's current resource plans include room for increasing the contribution to system requirements from these alternatives. (Tr. II, p. 165, l. 14 - 22.) However, for various reasons discussed more fully below, these generation sources are not a reasonable alternative to adding base load or intermediate generation resources to meet capacity needs in the 2016 and 2019 time period.

As for coal generation, the Company's analysis showed that coal generation capacity would not be competitive with combined cycle gas generation primarily due to the cost of constructing fully environmentally-compliant coal plants, as well as the recent increases in the cost of coal, and the potential costs associated with CO₂ emissions from coal generation. (Tr. II, p. 165, l. 5 – 13.) As Dr. Lynch testified, coal was competitive with nuclear only on the assumption that there would be no costs associated with CO₂ emissions. (Tr. VI, p. 1356, l. 11 - 13.) SCE&G did not believe that to be a reasonable assumption in light of the current political and environmental climate and considering the life-span of base load units. However, as Dr. Lynch testified, even if CO₂ costs are assumed to be zero, coal is still not the most competitive alternative to nuclear since under that assumption combined cycle gas generation is less expensive than coal. (Hearing Exhibit 12, JML-2, p. 9.) None of the parties contested SCE&G's conclusions related to coal generation.

The Company's analysis also showed that a generation plan based exclusively on simple-cycle gas generation was not competitive with combined-cycle generation under

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any set of cost assumptions. (Hearing Exhibit 12, JML-2.) Simple-cycle units are peaking units. Their much lower fuel efficiency results in higher overall costs to the system when they are relied on to serve what is predominantly a base load requirement. (Tr. II, p. 152, l. 3 - 8.)

As Dr. Lynch's testimony shows, the costs associated with future CO₂ regulation are a major driver in the comparative evaluation of nuclear generation, combined-cycle natural gas generation and coal generation. As compared to the nuclear generation scenario, a combined-cycle gas scenario would increase SCE&G's CO₂ emissions by 8,500,000 tons per year or 510,000,000 tons over the 60-year life of a plant. (Hearing Exhibit 12, JML-2, p. 3.) A coal scenario would increase SCE&G's emissions by 19,000,000 tons per year, or over 1.1 billion tons of additional CO₂ emissions over a 60 year plant life. (*Id.*, p. 4.) Given the magnitude of the increase in carbon emissions from the coal and natural gas scenarios, the cost analyses comparing combined-cycle gas generation and coal generation to nuclear are quite sensitive to assumptions concerning future CO₂ compliance costs.

The base case scenario prepared by Dr. Lynch's group showed that Units 2 and 3 would be more economical than combined-cycle gas generation if it is assumed that the cost of CO₂ emissions will \$15 per ton or more beginning in 2012 and will escalate at 7% per year in ensuing years. (Tr. VI, p. 1355, l. 18 - 20.) (The 7% escalation number reflects the inflation assumptions contained in earlier federal CO₂ legislation that would inflate the CO₂ charges by the rate of underlying inflation plus 5 percentage points.) (*Id.* at 1358, l. 21 - 22.) Under the \$15 per ton assumption, combined-cycle generation

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would cost customers on average \$15.1 million per year more than nuclear generation and coal generation would cost \$94.9 million more. (Id. at 1356, l. 1 - 2.) However, as Dr. Lynch testified, the \$15 per ton assumption is unrealistically low given the level of CO₂ charges that would be required to bring about a significant reduction in CO₂ emissions nationally. (Id., 1359, l. 1 - 4.) A more realistic but still low \$30 per ton assumption, the cost to customers of combined-cycle gas generation would exceed the cost of nuclear generation by \$125.7 million per year and coal generation would cost customers \$267.5 million per year more. (Hearing Exhibit 12, JML-2, p. 9.)

The Company's Resource Planning Department conducted sensitivity analyses on the results of its quantitative analysis of capacity options, in order to see how they might be affected by factors such as higher uranium prices, lower gas prices, reduced reliability of aging coal plants, the forced retirement of such plants, and zero cost for CO₂ emissions. In these sensitivity analyses, combined cycle gas generation emerged as more economical than nuclear only in cases of lower than anticipated natural gas prices (and at \$15 per ton CO₂) or zero CO₂ costs. (Tr. VI, p. 1356, l. 2 – 14.) Based on these studies, the Company's Resource Planning Department concluded that nuclear generation was the most economical resource to meet SCE&G's future supply needs. (Tr. VI, p. 1361, l. 19 – 22.) This conclusion was supported by the testimony of Mr. Marsh and Mr. Byrne, who reviewed it from the perspective of SCE&G's generation fleet as a whole, including its operational status, fuel mix, and fuel and environmental compliance costs and risks. (Tr. II, p. 157, l. 4 - 14; Tr. III, p. 554, l. 16 - 19.) Dr. Lynch testified that the fossil fuel plants (coal and gas) currently represent 73% of SCE&G's generation capacity, and if a

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combined-cycle natural gas plan were chosen over nuclear, they would represent 79% of that capacity in 2020. (Hearing Exhibit 12, JML-2, p. 2.) Dr. Lynch also testified that adding the additional nuclear capacity would decrease reliance on fossil fuels and therefore lead to a more balanced fuel mix for the system. Id

Mr. Marsh and Mr. Byrne testified that in recent years the fossil fuels on which the Company relies have become increasing uncertain both as to price and supply and are increasingly subject to the risks and volatility of global commodity markets. (Tr. II, p. 171, l. 8 – 16; Tr. III, p. 561, l. 19 – p. 562, l. 2.) In addition, they testified that combined-cycle natural gas generation is intermediate capacity and not, strictly speaking, base load generation. (Tr. II, p. 152, l. 3 – 8; Tr. III, p. 561, l. 11 - 13.) Adding intermediate capacity to the system, instead of true base load capacity, would increase the Company's reliance on its aging fleet of base load plants and increase the price risk to customers if operational problems or future environmental restrictions limited the use of those plants. (Tr. III, p. 632, l. 16 – p. 633, l. 8.) As Dr. Lynch testified, if the base case analysis is adjusted to reflect an increased forced outage rate for SCE&G's existing coal plants in future years, the nuclear strategy saves customers an additional \$28.8 million dollars per year over the combined-cycle gas generation scenario (\$44.9 million per year savings as opposed to \$15.1 million in the unadjusted study). (Hearing Exhibit 12, JML-2, p. 10.) Similarly, if the base case is adjusted to reflect the early retirement of the Company's smaller and older coal plants, the savings are an additional \$60.6 million per year (\$75.7 million per year compared to the same \$15.1 million). (Id) For these reasons, the Company's leadership determined that, in addition to its other advantages,

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building Units 2 and 3 will serve to strengthen the Company's aging base load capacity portfolio, diversify the Company's fuel mix and reduce customers' exposure to the risks and volatility of fossil fuel markets and supply.

a. Alternative Supply Resources

Certain of the intervenors argue that the Company failed to adequately consider alternative energy resources including wind, solar, landfill gas, and biomass and DSM/energy efficiency programs, or some combination of all of them. (Tr. III, p. 364, l. 13 – 19.) The Company's witnesses however, clearly indicated that these energy sources were considered but were determined not to be reasonable alternatives to new base load or intermediate generation at this time. (Tr. VI, p. 1369, l. 1 – 8.)

Landfill gas generation is one of the alternative energy sources that was considered in the Company's analysis of supply alternatives. (Tr. VI, p. 1339, l. 10 - 12.) Landfill gas is methane produced from the decay of organic matter in large municipal waste landfills. (Tr. II, p. 166, l. 2 - 3.)

Landfill gas is a limited resource because there are a limited number of landfill sites in South Carolina with suitable size and conditions for commercial methane production. (Tr. II, p. 166, l. 2 - 3.) In addition, the amount of energy these facilities can produce is quite small—approximately 5 MW per site—compared to the 1,228 MW of base load capacity SCE&G requires. (Tr. VI, p. 1343, l. 12 - 14.) Santee Cooper is already developing or is preparing to develop many of the suitable landfill gas sites in South Carolina. (Tr. VI, p. 1343, l. 18 - 21.) Given the limited number of sites and small output of these facilities, the Company concluded that they are not a reasonable substitute

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for the 1,228 MW of capacity that SCE&G will receive from Units 2 and 3. In light of the evidence of record, the Commission finds that the Company properly concluded that landfill gas generation was not a reasonable alternative source of capacity to meet SCE&G's needs at present. (Tr. VI, p. 1344, l. 3 – 4.)

Similarly, biomass generation is limited by the quantities of forestry waste and agricultural material that are available and suitable for use as biomass fuel. (Tr. II, p. 166, l. 6 – 8.) Two comprehensive studies have been done by third parties on the availability of this resource in South Carolina. (Tr. VI, p. 1345, l. 1 – p. 1346, l. 2.) Both indicate a theoretical potential for about 491 MW of such generation statewide, which would mean that there would be approximately 132 MW of potential biomass capacity in SCE&G's territory. (*Id.*) In addition, as Dr. Lynch testified, biomass plants tend to be more expensive to build than traditional generation sources. (Tr. VI, p. 1344, l. 14 – 17.) They have limited fuel efficiency, and therefore are not cost competitive with traditional generation sources even where sufficient fuel is available. (Tr. VI, p. 1344, l. 14 – 17.) Considering these facts, the Company properly concluded that biomass generation is not a reasonable alternative source of supply to meet its need for base load capacity in the 2016 and 2019 periods.

The Company also considered solar and wind power as potential alternative sources of energy. (Tr. VI, p. 1339, l. 11.) As Dr. Lynch, Mr. Marsh, and ORS Witness Evans testified, South Carolina is not well-suited climatologically for either wind or solar power. (Tr. II, p. 166, l. 9 - 10; Tr. VI, p. 1368, l. 12 – 13; Tr. VIII, p. 2140, 4 – 12.)

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The potential for wind generation in South Carolina is limited due to low average wind speeds. (Tr. VI, p. 1341, l. 4 - 5.) The only place where there is sufficient wind to support wind generation is off the South Carolina coast. (Tr. VI, p. 1342, l. 19 – 20.) The feasibility and cost of building wind-farms offshore in hurricane-susceptible areas like those off the South Carolina coast have not been demonstrated. (Tr. VI, p. 1343, l. 3 – 5.) South Carolina is not well suited to solar generation due to atmospheric conditions (*i.e.*, cloud cover, rain and haze). (Tr. II, p. 166, l. 9 – 10.)

Both types of facilities would have very low capacity factors in South Carolina, 20% or less for solar and 30%-35% for off shore wind. (Tr. VI, p. 1339, l. 19 – 20; p. 1343, l. 5 – 8.) These low capacity factors mean that, in practice, wind and solar facilities could produce only a small fraction of their theoretical output compared to nuclear plants which typically generate more than 90% of their rated capacity year in and year out. (Tr. VI, p. 1372, l. 16 – 18.) In addition, both wind and solar are expensive forms of generation in terms of their capital costs. The cost per MW of solar power substantially exceeds nuclear and other traditional generation sources, and as the FOE Witness Mrs. Brockway admitted, solar power is the most expensive form of power generation in commercial use today. (Tr. III, p. 486, l. 19 – 24; p. 487, l. 1 – 3.) Wind generation is also quite expensive and is primarily being built in locations where green-power mandates—rather than inherent economics—support its use. (Tr. VI, p. 1343, l. 5 – 6; p. 1387, l. 21 - 23.)

Furthermore, both wind and solar power are not “dispatchable” resources, meaning that the amount of energy that they produce cannot be varied with the needs of

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the customers. (Tr. VI, p. 1340, l. 1 – 2; p. 1341, l. 20.) Wind resources may or may not be available at the time of system peak, depending on atmospheric conditions at the time. (Tr. VI, p. 1340, l. 21 - 22.) In this regard, the testimony shows that the average wind speeds are slowest in South Carolina during daylight hours in the summer when customers' power needs are greatest. (Tr. VI, p. 1372, l. 19 - 22; p. 1373, l. 1 - 11; Hearing Exhibit 12, JML-8.) As to solar, SCE&G's system peak most often occurs on summer afternoons after 4:00 PM, even in optimal conditions solar panels can generate only about 20% of their theoretical capacity. (Tr. VI, p. 1340, l. 1 - 9.)

For those reasons, the capacity that wind and solar resources represent must be discounted heavily in assessing a utility's net reliable generation capacity. For example, Texas has some of the best conditions for wind generation of any state in the nation, but its transmission system operators allow utilities to count only 8.7% of installed wind generation capacity as net reliable capacity for meeting peak requirements. (Tr. VI, p. 1371, l. 13 - 16.) This means that additional, duplicative generation capacity must be maintained on the system equal to 91.3% of a utility's wind capacity.

For purposes of considering economically competitive alternatives for meeting customers' need for base load power in the 2016 and 2019 period, the Company has properly concluded that wind, solar, landfill gas, and biomass do not constitute resources on which it can prudently and economically rely at this time.

b. The Cost of Nuclear Construction

FOE and other intervenors contend that the Company's projected cost of Units 2 and 3 is unreasonably low, and that this low cost skews the economic analysis in favor of

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nuclear generation. (Tr. III, p. 364, l. 9 - 22.) FOE and others took the position that the unreasonably low projected cost of the Units created the lack of a reasonable basis on which to assess the cost of Units 2 and 3 compared to other alternatives.

i. The Unit 2 and 3 Cost Compared to Reported Data

In her testimony, FOE witness Brockway cited certain publications and reports indicating the all-in or future dollar costs of nuclear generation are estimated to be in the range of \$4,000/KW to \$8,000/KW. (Tr. III, p. 388, l. 5 - 20.) Ms. Brockway indicated that she was not able to determine the comparable costs per KW for Units 2 and 3. (Tr. III, p. 387, l. 17 - 18.) However, the public version of the Combined Application states that the cost in future dollars of SCE&G's 1,228 MW share in Units 2 and 3, including owner's costs, transmission, inflation, Allowance for Funds Used During Construction ("AFUDC" or capitalized interest) and contingencies, is \$6.3 billion or \$5,141/KW. (Hearing Exhibit 16, EEB-1-P, p. 3.) This figure is well within the range of costs Ms. Brockway indicated to be the current industry estimates in her testimony.

In addition, Ms. Brockway cited an October 2, 2008 document which indicates that the U.S. Department of Energy's ("DOE") loan guarantee program under Title XVII of the Energy Policy Act of 2005 received initial applications for 21 nuclear units with an aggregated cost as stated in the applications of \$188 billion. (Tr. III, p. 388, l. 24 - 27.) Mathematically, this would indicate approximately \$9 billion for each unit. (Tr. III, p. 388, l. 24 - 27.) However, the release does not provide information concerning the type or size of the Units in question (the leading Areva and GE units at 1,600 MW and 1,550 MW respectively are approximately half-again the size of a 1,100 MW AP1000

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unit and are priced accordingly). (Tr. III, p. 565, l. 10 – p. 566, l. 5.) Nor does the release provide information concerning the inflation assumptions and the expected completion dates of the plants, whether or not the requested amounts include AFUDC, the amount of contingencies contained in the cost estimates, and whether the sites are green-field sites or sites that already have been studied and developed for nuclear generation, the foundation conditions at the site and the amount included for other site-specific costs such as transmission, rail or other transportation upgrades. The DOE press release is not a reliable basis on which to evaluate the price projections for Units 2 and 3.

ii. The Reliability of the EPC Contract Price

On the other hand, the Company's cost projection for its share of Units 2 and 3 is based on a fully negotiated and executed EPC Contract with a leading supplier of nuclear generation facilities. (Tr. III, p. 578, l. 1 - 9.) More than half of the EPC Contract cost is subject to fixed pricing (*i.e.*, pricing with no escalation) or firm prices with adjustment provisions (*i.e.*, prices that are fixed in current dollars but have clearly defined inflation adjustments). (Tr. III, p. 592, l. 5 – 7.) As the EPC Contract indicates, most of the equipment and components of the plant that are uniquely nuclear in nature are subject to firm and fixed pricing.

In addition, the largest components of the contract price that are not subject to firm or fixed pricing are subject to clearly-established price targets. (Tr. III, p. 593, l. 1.) These target price components include the "craft" or construction labor for the project, and certain standard buildings such as warehouses and administrative spaces. (Tr. III, p. 592, l. 18 - 22.) As to these target price components, the EPC Contract contains

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important incentives for the EPC contractors to bring the project in below those targets as adjusted for actual inflation. (Tr. III, p. 593, l. 11 - 22.) In addition, the contractors are at risk to lose substantial amounts of their profit on the work if those price targets are not met. (Tr. III, p. 593, l. 11 - 22.) These provisions of the EPC Contract constitute meaningful incentives for the EPC contractors to ensure that target prices are reasonable and to manage the project to meet them. (Tr. III, p. 593, l. 7 - 14.) As a result, the EPC Contract provides a reliable basis on which to evaluate SCE&G's cost of nuclear construction for the purpose of Dr. Lynch's competitive economic studies.

iii. Contingencies as a Component of Cost

An important part of evaluating the reasonableness of the Company's price projection for the Units is evaluating the degree to which they include reasonable provisions for contingencies and inflation over the construction period, as the Base Load Review Act envisions.

As to these contingencies, Company witness Addison testified that the capital cost estimates included in the Company's price forecasts include a pool of contingency funds above those already included in the EPC Contract cost and the owner's cost and transmission cost estimates. (Tr. IV, p. 921, l. 14 - 16.) The amount of that contingency pool is \$438,293,000 in 2007 dollars, subject to escalation. (Hearing Exhibit 16, EEB-1.) This contingency pool represents approximately 10% of the base cost of the Units. This amount of contingency is reasonable in light of what is known about the project and its risks today. It provides further assurance that the Company's price projections do not

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underestimate the cost of nuclear capacity and so provide a reasonable basis for comparing nuclear capacity to other alternatives.

iv. Inflation as a Component of Cost

The Company's price projection also includes \$1.5 billion in assumed inflation over the construction period. (Hearing Exhibit 16.) In contesting the accuracy of the Company's cost projection, FOE witness Brockway suggests that the inflation component of the Company's price projection may be too low. (Tr. III, p. 394, l. 2 - 8.) (The general reasonableness and suitability of the Handy-Whitman and other inflation indices included in the EPC Contract and the Combined Application is discussed in more detail below.) However, as shown in Exhibit I, Chart B (Hearing Exhibit 16, EEB-2, p. 5.) to the testimony of Company witness Best, the inflation rates used in creating the Company's price projection are actual 2007 rates, including the current-year rate for 2007 and the five-year average 2003-2007. Given the high level of inflation in utility construction in the 2003-2007 time period, these rates are significantly higher than historically lower inflation rates for these indices. (See generally, Tr. VII, p. 1675 - 1677.)

For example, the Handy-Whitman All Steam and Nuclear escalation rate, which is the principal rate used in escalating the target price component of the plant, showed current year inflation of 7.7% for 2007 and a five year average of 5.75%. In 2002, the current year rate was 2.8% and the five year average was 2.5%. (Hearing Exhibit 16, EEB-2.) The other indices show a similar relationship between the inflation rates used in calculating the \$6.3 billion projection and the inflation rates from prior periods. (Id.)

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While inflation indices will vary from year to year, if history is any guide, the rates SCE&G has used to project the cost of Units 2 and 3 are not likely to understate actual inflation rates over the 12 year construction period of the plant. Accordingly, the Commission finds that the inflation rates used in deriving the Company's projection of construction prices for the Units do not understate that the likely cost of the plants for comparative economic evaluations are significantly higher than historical averages.

v. Delay as a Cost Risk

FOE witness Brockway also testified that delays in the construction schedule for Units 2 and 3 might be assumed to cause the ultimate costs of the Units to exceed the current projections. (Tr. III, p. 394, l. 12 - 15.) The completion dates for the Units, however, are subject to contractual guarantees. The EPC contractors have committed to complete the first Unit by 2016 and the second by 2019. They will pay substantial liquidated damages if they fail to meet this schedule. (Tr. III, p. 598, l. 13 - 14; p. 364, l. 14.) The Company is at risk for regulatory delays, but as to such delays, Company witness Byrne testified the NRC licensing schedule for the plant and the construction schedule contained in the EPC Contract are reasonable. (Tr. III, p. 635, l. 7 - 14.) Furthermore, as Company witness Addison testified, inflation represents roughly 24% of the Company's construction price projection. (Tr. XIII, p. 2951, l. 21-23.) For these reasons, the Commission does not find support for the contention that the risk of delay is a reason to discount the nuclear construction costs.

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vi. Conclusion as to the Cost of Nuclear Construction

For all these reasons, the Commission finds that SCE&G's analysis of the costs of nuclear generation as compared to other alternatives is based on a reasonable assessment of the cost of Units 2 and 3. Those costs have been reasonably estimated by the Company and do not constitute a flaw in the Company's analysis of the comparative economics of alternative generation resources as suggested by the intervenors.

c. The Ability of the Plant to Meet Projected Capacity Factors

Dr. Wilder, testifying on behalf of Ms. Thomas, contested SCE&G's ability to operate Units 2 and 3 at the capacity factors projected in the comparative supply analyses. (Tr. VI, p. 1283.) This argument goes to the relative cost of nuclear production compared to other alternatives. (Tr. VI, p. 1284.) Company witness Byrne testified in rebuttal that improvements in nuclear plant capacity factors over the past decades have been due to improvements in things like preventive and predictive maintenance programs, inspection and testing of equipment, staffing, training, human performance management, management of nuclear operating culture, fitness for duty standards, root cause analysis of problems and events, management of engineering processes, outage scheduling and management, and vendor and supplier quality control. (Tr. III, p. 636, l. 2 - 16.) These improvements apply across the board to nuclear operations, independent of the specific design of the Units in question. (Tr. III, p. 636, l. 8 - 9.) Mr. Byrne also testified that SCE&G intends to use the personnel and nuclear operating culture it has established at Unit 1 as the basis for establishing the staffing and operating culture for

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Units 2 and 3. (Tr. III, p. 636, l. 17 - 19.) In addition, as Mr. Byrne testified, Westinghouse AP1000 technology represents an updated design of the Westinghouse pressurized water reactor technology currently in use at Unit 1. Moreover, the AP 1000s' passive safety systems should make the new Units simpler and less expensive to operate and maintain than earlier Westinghouse units. (Tr. III, p. 572, l. 11 - 19.) Based on all these factors, the Commission concludes that the anticipated capacity factors for Units 2 and 3 as included in Dr. Lynch's resource planning analyses are reasonable and appropriate for use in evaluating long-term nuclear operating costs.

d. Conclusion as to System Economy

The Company's witnesses testified extensively in support of the reasonableness of the price, schedule and cost projections on which the decision to select Units 2 and 3 was made. The EPC Contract, the inflation and contingency adjustments, the project schedule and the cost projections presented by the Company have been extensively reviewed and audited by the ORS staff experts, as well as by the independent outside experts in generation plant construction that ORS has employed to assist in the audit of the Combined Application. (Tr. VIII, p. 1903, l. 21 – p. 1904, l. 2; Tr. VIII, p. 1954, l. 5 – 18.) Those ORS witnesses have testified that their audit and review confirmed the reasonableness of the projections and assumptions contained in those documents. (Tr. VIII, p. 1954, l. 5 – 18.)

For all these reasons, the Commission finds that the cost projections and comparative economic analyses on which the selection of Units 2 and 3 was made are reasonable and appropriate. Based on these specific economic analyses and the broader

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evaluation of system needs by SCE&G's leadership team, the Company properly concluded that the construction of Units 2 and 3 would provide the greatest and most dependable contribution to system economy of all reasonably competitive alternatives.

2. Contribution to System Reliability

In evaluating the contribution of Units 2 and 3 to system reliability, the Commission is required to assess the ability of the facility when constructed to operate reliably and to support reliable electric service to SCE&G's customers. One intervenor, Mr. Wojcicki, challenged the proposed site of Units 2 and 3 as being unsuitable from a reliability standpoint because of concerns about the sufficiency of water supply for the Units during drought conditions and because of their location in relation to system load centers.

a. Water Supply

The record shows that Units 2 and 3 will benefit from a unique combination of water resources available at the site. Units 2 and 3 will be built adjacent to the Broad River which is one of the major river systems in South Carolina. The adequacy of the Broad River's water supply is shown by its "7Q10". The 7Q10 is a standard measurement representing low flow with a ten-year return frequency. In other words, it is the lowest stream flow for seven consecutive days that would be expected to occur once in ten years. (Tr. X, p. 2497, l. 3 – 7.) The 7Q10 for the Broad River downstream of the facility at the Alston USGS gauge calculated in March 2007 is 853 cfs. The normal water use during normal operations of the facility, which is approximately 83 cfs,

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of which a portion is returned to the Broad River, represents less than 10% of the 7Q10 flow. (Tr. X, p. 2497, l. 8 – 12.)

At the point where Units 2 and 3 will be built, the Broad River is impounded by SCE&G's Parr Reservoir. The Units themselves will not draw cooling water directly from Parr Reservoir, but from the Monticello Reservoir, a 6,800 acre lake connected to Parr Reservoir which serves as the reservoir for the Fairfield Pumped Storage facility that SCE&G constructed in the 1970s. When full, Monticello Reservoir holds 29,000 acre feet of usable water, which is enough water to meet the needs of Units 1, 2 and 3 operating at full capacity for approximately 2.5 months. (Tr. III, p. 552, l. 20 – p. 553, l. 4; Vol. X, p. 2498, l. 5-8.) In addition, there are eight pumping turbines at the Fairfield Pumped Storage facility with a combined rating of 576 MW. These turbines can pump water up from the Parr Reservoir into Lake Monticello where it can be released to generate electricity or stored for use as cooling water for Units 2 and 3. The Fairfield Pumped Storage facility allows SCE&G to replenish Monticello Reservoir at any time that there is an adequate volume of water in the Broad River or the Parr Reservoir, even if that volume of water is available only for a short period of time. (See generally, Tr. III, p. 547, l. 9 - p. 553, l. 7.)

As indicated above, the record shows that the operation of Units 2 and 3 will require a modest amount of water compared to the amount of water available in the Broad River and Monticello Reservoir. Furthermore, the Jenkinsville site provides the Company with the unique ability to collect water in the Parr Reservoir and to use Fairfield Pumped Storage pumps to replenish Monticello Reservoir whenever conditions

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in Parr Reservoir and the Broad River permit. (Tr. III, p. 551, l. 21 – p. 553, l. 7.) As witnesses for both the Company and ORS testified, the water supplies available at the site of Units 2 and 3 are more than adequate to support reliable operations of Units 2 and 3. (*See Id.*; Tr. IV, p. 757, l. 18 – 25; Tr. VIII, p. 2152, l. 9 – 18; Tr. X, p. 2514, l. 18 – p. 2515, l. 4.)

b. Transmission

Mr. Wojcicki also contended that the location of Units 2 and 3 in Jenkinsville does not support the reliability of the system because of its distance from load centers in coastal areas of SCE&G's service territory. However, as SCE&G's Manager of Transmission Planning, Mr. Young, testified SCE&G's largest load center is not located along the coast but in the central portion of South Carolina, where Units 2 and 3 will be located. If the units were located at the coast, new transmission lines connecting them to the load center in the central portion of the state would be required. Moreover, currently there are six SCE&G transmission lines and two Santee Cooper lines serving the site of Unit 1 and only four new SCE&G lines and two new Santee Cooper lines will be needed to move the additional power to be generated by Units 2 and 3. A coastal site would not have an existing transmission infrastructure such as the one at the Jenkinsville site and would require a full complement of six to ten new transmission lines to distribute the power generated to different areas of the system. (Tr. XII, p. 2793, l. 13 – 21.)

For these reasons, the decision to locate Units 2 and 3 in central South Carolina and not along the coast as advocated by Mr. Wojcicki is prudent and reasonable and does not impair the reliability of those Units to serve customer load from a transmission

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standpoint. Neither water supply nor transmission issues are likely to compromise the reliability of those units. Mr. Wojcicki's motion to require relocation is denied.

E. Reasonable Assurance that the Facilities Can Comply with Applicable State and Local Laws

The fifth finding required by the Siting Act is whether “there is reasonable assurance that the proposed facility will conform to applicable state and local laws and regulations.” S.C. Code Ann. § 58-33-160 (1)(e). Hearing Exhibit 2 contains a list of the 19 major permits, apart from NRC permits, required to construct and operate Units 2 and 3. (Hearing Exhibit 2, SAB-7, p. 1 – 3.) Three of the 19 major permits are federal permits exclusively: a Federal Energy Regulatory Commission permit for work on Monticello Reservoir, a Corps of Engineers wetlands permit for site work, and a Federal Aviation Commission permit for construction cranes to be erected on site. The remaining 16 permits are state permits or joint state-federal permits administered by the state. (Hearing Exhibit 31, SES-1, p. 1 – 3.) The record reflects that, so long as SCE&G obtains these 16 permits and operates according to their terms, the construction and operations of Units 2 and 3 will be in compliance with all state and local laws. (Tr. X, p. 2428, l. 11 – p. 2429, l. 10.)

Company witness Byrne testified that in his opinion and in the opinion of the members of his new nuclear deployment team, all of these permits could be obtained in a timely fashion and that Units 2 and 3 could be operated in compliance with all applicable laws and regulations, both state and federal. (Tr. III, p. 610, l. 9 – 16.) Mr. Byrne's testimony on this point was not contradicted by any party. Accordingly, the record

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supports the finding that Units 2 and 3 can be built and operated in compliance with all applicable state and local laws and regulations as the Siting Act requires.

F. Public Convenience and Necessity

The sixth and final finding required by the Siting Act is whether “public convenience and necessity require the construction” of the proposed facilities. S.C. Code Ann. § 58-33-160(1) (f). The Commission construes this provision of the statute as requiring a finding that integrates into a single determination all aspects of the public interest evaluation related to the plant. In this case, the record demonstrates that Units 2 and 3 represent capacity that is needed to supply reasonably forecasted customer demands. In addition, the size, type, location and technology of the Units are the preferable means of doing so with the greatest economy and reliability and with the least impact on the environment.

As discussed above, the principal benefit of nuclear generation, in addition to lower forecasted costs, is the fact that it helps insulate customers from the price volatility and supply risk that are increasingly associated with fossil fuel fired generation. Nuclear generation also insulates customers from future CO₂ and other environmental compliance costs associated with fossil fuels, which are likely to be significant. Alternative energy sources may provide useful supplemental energy for SCE&G’s system going forward. However, the cost competitiveness, availability and reliability of alternative energy sources are subject to significant questions and concerns at this time. Public convenience and necessity would not be supported by forcing SCE&G’s customers to rely on the

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future availability and cost competitiveness of these energy sources as a substitute for SCE&G constructing additional base load capacity at this time.

The risks related to nuclear construction, and the steps that SCE&G has taken to mitigate them, are discussed extensively in the record. The Company's plans to manage licensing risks and delays and to oversee construction through its own personnel and processes are also discussed more fully below. The record shows that the Company has carefully evaluated the risks related to nuclear construction and operations and compared them to the risks and costs of other alternatives. The Commission agrees with this assessment and finds that the public convenience and necessity support the construction of Units 2 and 3 as proposed by SCE&G.

IV. BASE LOAD REVIEW ACT FINDINGS

The Base Load Review Act requires the Commission to go beyond the public convenience and necessity findings required under the Siting Act and to conduct a full pre-construction prudency review of the proposed Units and the EPC Contract under which they will be built. The Commission must also set out construction schedules and annual capital cost schedules which will establish the prudency and reasonableness of plant capital costs if such schedules are met.

A. The Prudence and Reasonableness of the Decision to Proceed with Construction of Units 2 and 3

The first finding that the Commission is required to make under the Base Load Review Act is whether "the utility's decision to proceed with construction of the plant is prudent and reasonable given the information available to the utility at the time." S.C. Code Ann. 58-33-270(a)(1). The discussion that follows describes in detail the support

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for this Commission's findings on this standard. The Act also requires related findings concerning the "choice of the specific type of unit or units and the major components of the plant" as well as "the qualification and selection of the principal contractors and suppliers for the plant." S.C. Code Ann. 58-33-270(b)(4),(5). These findings are the heart of the pre-construction prudency review envisioned by the Base Load Review Act. They require the Commission to make a comprehensive assessment of the decision to build the plant to determine if that decision is reasonable and prudent based on all available information.

In addition to the Siting Act findings listed above, factors showing that the Company's decision to proceed with construction of Units 2 and 3 is prudent and reasonable include: a) the selection of the Jenkinsville site for Units 2 and 3; b) the selection of AP1000 technology as the appropriate reactor technology for this project; c) the related decision to select Westinghouse Electric Corporation, LLC and Stone & Webster, Inc. as the nuclear system supplier and construction contractor, respectively; d) the selection of other major contractors for the project; e) the structure and terms of the EPC Contract; f) the price at which the plant is being constructed; and g) the Company's ability to execute its financing plan for construction of the Units. Each of these matters is considered below.

1. The Selection of the Jenkinsville Site

The record shows that the Jenkinsville site was selected for Units 2 and 3 based on a series of four site evaluation studies conducted over 34 years. (Hearing Exhibit 2, SAB-1, p. 5.) These studies consistently identified the Jenkinsville site as being among

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the most suitable of the sites on SCE&G's system for the construction of a new base load generating unit. (Id.; Tr. III, p. 548, l. 6 – p. 551, l. 9.)

The record shows that SCE&G selected the Jenkinsville site as the site for Units 2 and 3 for a number of appropriate reasons. The site is near SCE&G's principal load centers and is already served by extensive existing transmission infrastructure. (Tr. III, p. 653, l. 24 – p. 654, l. 2.) It is located on land that SCE&G owns and has operated as a nuclear generation site for decades. (Tr. III, p. 548, l. 6 – p. 551, l. 9.) Nuclear security, nuclear operations support, and nuclear training and administrative facilities are already in place on the site, along with rail transportation infrastructure necessary to support construction and operation of the new units. Id. The site has a superior water supply and superior geological and seismic suitability for use as a nuclear construction site. (Tr. III, p. 550, l. 20 – 21.) Because the site has supported successful nuclear operations for over 34 years, its geological and environmental features have been extensively studied, monitored and analyzed for an extended period of time. (Tr. III, p. 548, l. 6 – p. 551, l. 9.)

The ORS audited and evaluated the site selection process and criteria as well as the decision to select the Jenkinsville site. ORS Witness Crisp testified that the Jenkinsville site was particularly appropriate because the foundation at the proposed site is composed of bedrock as opposed to a coastal marl. A coastal plain site would significantly increase the cost of the project. (Tr. VIII, p. 2159, l. 1 – 6.) In addition, issues regarding potential wetlands, the necessity for obtaining transmission right of ways

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and related environmental and property issues strongly favor the placement of this project at the Jenkinsville site. (Tr. VIII, p. 2159, l. 6 – 19.)

Specific concerns were raised at the hearing concerning the seismic suitability of the site. In response, Company witness Whorton, who was involved in the original geological work to license Unit 1, reviewed the detailed geological investigations of the site that have been conducted over more than 25 years. As Mr. Whorton testified, the geology of the site was extensively studied during the licensing and the construction of Unit 1. It was then subject to subsequent seismic reassessments by the NRC after Unit 1 went into operation and then again during the license extension evaluation for Unit 1. Further geological investigation and seismic evaluation was done in preparation of the NRC license application for Units 2 and 3.

Mr. Whorton testified that the seismic design of the AP1000 unit is more than sufficient to withstand the postulated design basis seismic event for the Jenkinsville site, including a recurrence of the largest recorded earthquake in the Southeastern Piedmont Province (the Union County earthquake of January 1, 1913) occurring at the plant. (Tr. X, p. 2533, l. 3 – 5.) Mr. Whorton also testified that nuclear plants are designed with significant margins of seismic safety. (Tr. X, p. 2528, l. 8 – 18.) Several Japanese nuclear units which were designed to approximately the same seismic standards as Unit 2 and 3 recently survived an earthquake of substantially higher magnitude than the design basis event for the Jenkinsville site, with no damage to plant safety functions. (Tr. X, p. 2639, l. 1 – 21.) The record clearly establishes the suitability of the site from a seismic perspective.